

CLAIMS

What is claimed is:

1. A vacuum cleaner comprising:
  - a housing defining a cyclonic airflow chamber for separating contaminants from a dirt-containing airstream, said housing further comprising a cyclonic chamber inlet and an airstream outlet in fluid communication with said cyclonic airflow chamber;
  - 5 a nozzle housing including a suction opening, said suction opening being fluidly connected with said cyclonic chamber inlet;
  - an airstream suction source fluidly connected to said main suction opening and to the cyclonic airflow chamber for transporting dirt-containing air from the main suction opening to the cyclonic airflow chamber, said suction source is adapted to
  - 10 establish and maintain a dirt-containing airstream from said main suction opening to said cyclonic chamber inlet;
  - a dirt-collecting bin mounted beneath said cyclonic airflow chamber, the dirt-collecting bin comprising a bottom wall and a cylindrical sidewall;
  - 15 a separator plate between the cyclonic airflow chamber and the dirt-collecting bin and separating the cyclonic airflow chamber from a dirt-collecting bin, the separator plate having a diameter less than a diameter of the cyclonic airflow chamber adjacent the separator plate to thereby define a gap between the separator plate and the cyclonic airflow chamber for passage of dirt separated from the dirt-containing airstream in the cyclonic airflow chamber whereby the passage of dirt through the gap is
  - 20 accompanied by airflow patterns having horizontal and vertical components between the gap at one side of the dirt-collecting bin and the bottom wall at an opposite side of the dirt-collecting bin, which airflow tends to entrain dirt particles therein; and
- 25 Airflow inhibitors in the dirt-collecting bin to reduce the vertical component of the elliptical airflow, thereby tending to agglomerate and separate the dirt particles from the elliptical airflow.

2. A vacuum cleaner according to claim 1 wherein the flow inhibitors comprise at least one prong extending upwardly from the bottom wall of the dirt-collecting bin and positioned radially between a center of the dirt-collecting bin and the sidewall thereof.

3. A vacuum cleaner according to claim 2 wherein the flow inhibitors comprise a plurality of said prongs each positioned radially between a center of the dirt-collecting bin and the sidewall thereof.

4. A vacuum cleaner according to claim 3 wherein the prongs extend a portion of the distance from the bottom wall and the separator plate.

5. A vacuum cleaner according to claim 3 wherein the prongs are rectangular in cross section.

6. A vacuum cleaner according to claim 5 wherein the prongs in cross-section have a long axis that is radially disposed in the dirt-collecting bin.

7. A vacuum cleaner according to claim 3 wherein the prongs are equally spaced about the bottom wall of the dirt-collecting bin.

8. A vacuum cleaner according to claim 3 wherein the airflow inhibitors further comprise at least one fin that extends radially inwardly from the sidewall of the dirt-collecting bin.

9. A vacuum cleaner according to claim 2 wherein the airflow inhibitors further comprise at least one fin that extends radially inwardly from the sidewall of the dirt-collecting bin.

10. A vacuum cleaner according to claim 9 wherein the airflow inhibitors comprise two and only two fins.

11. A vacuum cleaner according to claim 10 wherein the fins are generally positioned vertically below the inlet.
12. A vacuum cleaner according to claim 9 wherein the at least one fin is positioned vertically below the inlet.
13. A vacuum cleaner according to claim 12 wherein the at least one fin extends a portion of the distance between the bottom wall and the separator plate.
14. A vacuum cleaner according to claim 13 wherein the at least one fin extends between 40% and 60% of the distance between the bottom wall and the separator plate.
15. A vacuum cleaner according to claim 9 wherein the fins have a radial dimension between 2% and 10% of the radius of the dirt-collecting bin.
16. A vacuum cleaner according to claim 9 wherein the fins have a radial dimension between 3% and 6% of the radius of the dirt-collecting bin.
17. A vacuum cleaner according to claim 9 wherein the fins have a radial dimension equal to about 4% of the radius of the dirt-collecting bin.
18. A vacuum cleaner according to claim 1 wherein the flow inhibitors comprise at least one fin that extends radially inwardly from the sidewall of the dirt-collecting bin.
19. A vacuum cleaner according to claim 18 wherein the airflow inhibitors comprise two and only two fins.
20. A vacuum cleaner according to claim 19 wherein the fins are generally positioned vertically below the inlet.

21. A vacuum cleaner according to claim 19 wherein the fins extend a portion of the distance between the bottom wall and the separator plate.

22. A vacuum cleaner according to claim 19 wherein the fins have a radial dimension between 2% and 10% of the radius of the dirt-collecting bin.

23. A vacuum cleaner according to claim 22 wherein the fins have a radial dimension between 3% and 6% of the radius of the dirt-collecting bin.

24. A vacuum cleaner according to claim 23 wherein the fins have a radial dimension equal to about 4% of the radius of the dirt-collecting bin.

25. A vacuum cleaner according to claim 18 wherein the at least one fin is positioned generally below the inlet.

26. A vacuum cleaner according to claim 18 wherein the at least one fin extends a portion of the distance between the bottom wall and the separator plate.